

William Fleming

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BATHING

AND THE

BUXTON WATERS:

WITH

DR. LYON PLAYFAIR'S ANALYSIS.

BY THOMAS CARSTAIRS, M.D.,

PHYSICIAN TO THE BUXTON BATH CHARITY.

Third Edition.

LONDON :

C. MITCHELL, RED LION COURT, FLEET STREET ;

BUXTON :—W. D. SUTTON, HERALD OFFICE.

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Preface to the Third Edition.

THE thorough change which Buxton has undergone during the last twelve months, renders a new description of the Baths, &c., indispensable, and as the Second Edition of this little work was exhausted, I have endeavoured to describe Buxton as it is—or will be, when the improvements now in progress are carried out, in this Edition.

The Square, Buxton,

May 2nd, 1853.



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THE BUXTON WATERS.

CHAP. I.

ON THE STRUCTURE AND FUNCTIONS OF THE SKIN.

GREAT efforts have been made during the last twenty years to extend a knowledge of physiology among all classes of the people,—teaching them the structure and functions of the various portions of their frame, with the humane object of persuading them how necessary an observance of the natural laws is for the preservation of health. Although the exertions of these philanthropic teachers were at first attended with little encouragement, they persevered in their labours, and of late years there has been a gradual desire rising up on every side for a more intimate acquaintance with the physical formation of man, and sounder views of the philosophy of living have been steadily gaining ground. The present age is truly one of enquiry, research, and, if beneficial and attainable, of practice. Mankind now do not take up a theory on the authority of some great name, and blindly act upon it. They sift, try, and prove it—rejecting it if wrong, and adopting it if right. They must have sound reasons before they will believe new propositions, but when convinced of their truth, they willingly assist in removing every impediment calculated to retard their progress, particularly if they have for their end the moral or physical improvement of the human race.

One of the points principally dwelt upon by all writers and lecturers on popular physiology has been the importance of the skin, as a secreting and excreting organ, and the impossibility of preserving health unless its important functions were properly performed, which could only be by constant

attention to cleanliness and bathing. Although the truth of this was universally acquiesced in by all who paid any attention to the subject, still for years they rarely acted up to what they could not help believing. With the exception of the hands, face, and feet, the great extent of the skin never came in contact with water at all, but almost from the cradle to the grave, was suffered to be plastered over with its own accumulating secretion, till the wonder arose that it was pervious at all. That even moderate health was enjoyed under such carelessness would appear impossible, did we not know what efforts Nature is capable of making, even when her laws are infringed upon, and how she often kindly substitutes increased action in one organ to compensate for the deficiency of another. But this state of things cannot last always, and by compelling one part to perform a function for which she has provided another, a double burden is imposed, under whose weight the overtaxed organ must sooner or later give way.

The skin performs two most important offices in the animal economy—it is a drain through which a certain portion of the *debris* or worn-out particles of the body is given off in the form of perspiration, by means of its numerous tubes; while, at the same time, it is the index which, by means of sensibility, conveys to the mind the temperature of the surrounding media. To shew the necessity of having the course of these perspiratory tubes or drains perfectly clear, and to give some idea of the mischief which must arise if they are impeded, it is only necessary to refer to their extent as estimated by Dr. Erasmus Wilson, in his lately published “Treatise on Healthy Skin.” He says, “To arrive at something like an estimate of the value of the perspiratory system in relation to the rest of the organism, I counted the perspiratory pores in the palm of the hand, and found 3,528 in a square inch. Now, each of these pores being the aperture of a little tube about a quarter of an inch long, it follows, that in a square inch of skin on the palm of the hand there exists a length of tube equal to 882 inches, or $73\frac{1}{2}$ feet. * * *

To obtain an estimate of the length of tube of the perspiratory system of the whole surface of the body, I think that 2800 might be taken as a fair average of the number of pores in

the square inch, and 700, consequently, of the number of inches in length. Now, THE NUMBER OF SQUARE INCHES OF SURFACE IN A MAN OF ORDINARY HEIGHT AND BULK IS 2,500 ; THE NUMBER OF PORES, THEREFORE, 7,000,000, AND THE NUMBER OF INCHES OF PERSPIRATORY TUBE 1,750,000, THAT IS 145,833 FEET, OR 48,600 YARDS, OR NEARLY TWENTY-EIGHT MILES.

Let me ask, is it possible, with this calculation, which my own observation with the microscope proves to be rather under than over the mark, to over-estimate the value of preserving the skin in a sound, healthy condition? Night and day, it is constantly at work, exuding worn-out particles of the body held in solution by the excess of water in the blood, and guarding it against the consequences of those vicissitudes of temperature we are constantly exposed to, and which, without such a protection would speedily destroy life, by the depressing action of cold, at one time, and the exciting effects of heat at another. By the wise provision of nature in constructing the skin, we can bear the intense cold of a northern winter, or pass, unscathed, over burning sands, under the vertical sun of the Line. Men live and enjoy good health in the Arctic regions where spirits of wine are frozen, and glass-blowers and those employed in iron-works are in the regular habit of working at a temperature of 360 deg. Chaubert, the fire-king, had his furnace heated sometimes as high as 600 deg., and remained in that heat while a joint of meat was cooked beside him. The animal heat is preserved in the one case, and the inevitable fever prevented in the other, by this property of perspiration. It becomes more abundant and perceptible when the body is in exercise, or exposed to a high temperature, and is termed *sensible perspiration*, but never ceases even when the body is in a state of perfect rest, although it is then so limited in quantity as to be imperceptible, and is called *insensible perspiration*. These relative conditions of observable perspiration depend, however, not merely on the quantity of perspired fluid, but also on the dry or moist state of the surrounding atmosphere, —the former carrying off the fluid as rapidly as it is exuded, while the latter being already charged with moisture, is incapable of retaining any more—so that all other circumstances

of activity and temperature being the same, sensible becomes insensible perspiration, and *vice versa* just as the air is dry or moist. The quantity of matter thus carried off by the skin has been variously computed, and varies in individuals according to the state of the general circulation. Lavoisier calculated it at eleven grains per minute, which will amount to thirty-three ounces in twenty-four hours, of which of course a large proportion is water, about one per cent. being solid matter.* Every one knows the relief afforded during fever by a copious perspiration, the grateful change from burning thirst and restlessness to calm and cool repose; and the effects of checked perspiration in preventing the escape of these deleterious matters from the circulation are well known as the exciting cause of a great majority of acute diseases. As already stated, any interruption to the free performance of this function increases by so much the labour of the internal secreting organs, viz. : the liver, the kidneys, or the lungs, disturbing in a greater or less degree, their equilibrium, and frequently producing disease in them. Every one who values the happiness of his fellow creatures, must rejoice at the establishment of so many baths, and the provision thereby made to afford the working classes the means of keeping this organ in health. Personal cleanliness and domestic comforts are now universally acknowledged to exert a powerful influence over the morals and habits of the people, and therefore it is pleasant to see reform beginning at the right end.

The skin is composed of two layers perfectly distinct in their structure, and each performing a separate action in the economy. The scarf or outer skin is intended as a protection to the deeper seated layer,—the *dermis*, or true skin, and has been found to be composed of albumen, the same as the dried white of egg, which is soluble in alkalis. Soap which ought always to be used for the purpose of cleansing the skin, is composed of an alkali and oil, the former being in excess, and

* Seguin ascertained that the skin exhaled in 24 hours—

Organic matter	...	...	...	...	107.47	grains.
Saline matter	...	...	...	...	81.92	„
Water and volatile matter	...	...	...	...	15750.61	„

15940 „

this uniting with the oil of perspiration bedewing the skin forms a sort of emulsion, with which a portion of the adherent covering is removed, and the process being repeated the whole is cleared away. Every fresh application wears down so much of the surface of the scarf-skin, that at last it becomes painfully sensible to impressions which formerly would have been disregarded,—as in the hands of washerwomen after a hard day's scrubbing. It forms an accurate cast over the sensitive skin, following its various convolutions and turnings, and by being thicker in those places most exposed to bruises and pressure, prevents numerous accidents which otherwise would be productive of great pain and constant inconvenience. It is this skin which is removed by a blister, or scalds, and very few are ignorant of the pain which a simple current of cold air passing over a surface thus denuded will produce. The difference of colour in the various races of mankind lies in the deeper-seated and newly-formed layers of this structure.

The *dermis* or true skin is admirably adapted by its anatomical formation for the duties it is required to perform. It is the part by which sensation and the knowledge of external impressions is conveyed, and it is the organ which affords defence to the deeper parts of the body. We find that it varies in thickness on different parts of the body according to the pressure to which they are exposed, and that besides the investing scarf skin externally, it is still further protected from injury by the soft elastic cushion of cellular membrane on which it rests. Nerves and blood-vessels are extensively distributed over its surface—in fact these form so perfect a network that the finest needle cannot be inserted in any part without causing pain and bleeding, shewing that both nerve and blood-vessel have been injured. The capillaries, or intermediate vessels which convey the blood from the arteries to the veins form a most important part of its composition. The varying colour of the skin in the same individual depends on the gorged or empty state of its capillaries, and the rapidity with which the circulation through them is carried on. The act of blushing from some mental emotion or unexpected excitement is caused by the sudden rush of blood through the capillaries in the face and neck; while the pallor which ac-

companies fear and sometimes anger depends on the contraction of these vessels forcing the blood inwardly. The blue colour of the skin, observable in cold weather, depends in the first place on the depression of the nervous system, and the consequent languid movements of the blood through these intermediate vessels. This condition is still farther illustrated by the blue colour of the skin observed in the most severe cases of the collapse stage of Cholera, and the dismal tint assumed by noses generally rubicund, when exposed to the bitter bitings of a North-Easter. It appeared necessary to offer these brief explanations of the composition and structure of the skin in order that my readers may be able to understand the full importance of bathing and the manner in which it acts in the preservation or restoration of health.

In speaking of baths it is better to state at once that the terms *cold*, *cool*, *tepid*, *warm*, and *hot*, are merely relative—that the sensation depends entirely on individual susceptibility; that what is tepid for one person is hot or cold for others, and even for the same person under altered circumstances of bodily temperature or health. That temperature which would be agreeable to a person in good health, feels cold when he is suffering from the rigor of fever. The thermometer, therefore, affords us only a partial guide in defining and applying these terms to different temperaments. We will take water at the ordinary temperature of spring water, and point out its effects on the body, and then enquire how far the increase of temperature and other circumstances influence the operation of the natural springs of Buxton both in health and disease.

The sudden application of cold water to the whole surface of the body produces what is called a shock, and for a moment one of the most powerful sensations that can be experienced. The blood is driven from the skin—the capillary vessels, minute arteries, and veins are contracted—the heat of the surface of the body is abstracted, and the perspiratory process suspended. If the immersion be momentary, the natural state of the vessels is soon restored, but if the body is retained long in the cold medium, the internal vessels become loaded, the skin shrinks and becomes pale,—an unpleasant load rests

on the chest—the breathing becomes difficult and gasping—the pulse is lowered both in frequency and force—the animal heat is diminished—cold, shivering, and sometimes cramp in the limbs occurs—and if the immersion be continued, all these symptoms are aggravated, with great depression of the nervous power. In strong constitutions what is termed *re-action* takes place very speedily after immersion, and in the water, but in others, who are weaker, it only occurs satisfactorily after a very short contact, and sometimes requires other means, such as heat and friction to restore it. In re-action the blood returns to the surface,—a general glow of heat and comfort pervades the whole frame—the circulation is more energetic—the load taken off the internal vessels renders the respiration easy—the temperature is increased—perspiration goes on more briskly—nervous power is increased—the whole body is buoyant with recruited energies, and the mind and spirits partake of the general excitement. Individuals who accustom themselves to the use of the cold bath frequently require to extend the duration of immersion before re-action is established, but when by using muscular exercise, it does take place, it is more satisfactory and decided. Sometimes, if the water be much colder than the skin, or if the bath be too long continued, re-action becomes too violent, and instead of the agreeable glow to which I have referred, shivering, head-ache, and other symptoms of fever or local congestion follow, and much mischief may result. In order that these effects of cold bathing may be fully and agreeably realized, it is necessary that the surface of the body should be of a moderate temperature at the time of immersion; neither depressed by cold, nor over excited by exercise. Although, in my opinion, the danger of cold bathing when in a state of perspiration has been most absurdly exaggerated, still as this *brochure* is intended for the invalid, I cannot say that I would recommend its indiscriminate practice. The stout and athletic may pursue it without inconvenience, but it is only in a very few cases of disease that its practice could be suffered. The tepid or warm is a most agreeable method of using the bath,—it exerts a soothing influence on both body and mind—softens and relaxes the skin—increases perspiration—excites

the capillaries to greater activity—draws the blood from internal organs to the surface—calms the circulation—subdues nervous irritation—and produces the most agreeable and refreshing feelings of comfort and satisfaction. When the temperature is much above blood heat, 98 deg. of Fahrenheit, it excites and disturbs the circulation—the skin becomes red and swollen—the arteries conveying blood to the head throb violently—the face becomes turgid—the eye inflamed,—and the excited circulation through the brain soon shews its effects on that organ, and would produce apoplexy if the cause were continued. Where the bath is thus abused, the person on leaving it feels weak and exhausted—the whole mental and bodily powers are sunk—the pulse continues quick—there is noise in the ears, and head-ache, which are only relieved by rest and copious perspiration. A temperature about, or of four or five degrees above, blood heat will be found the most agreeable, and will be borne longer than one much above or much below that standard.

A strong prejudice exists that the body is rendered more liable to be affected by cold after a warm bath, and that it weakens and enervates the system. The very reverse is the case. The skin is better able to perform its function from having had its extreme vessels cleansed and rendered more fit for exhaling the secretions; and the practice in Russia of rolling among snow after a warm bath, is at once in accordance with theory and experience. The skin is braced and strengthened, and more capable of resisting the depressing influence of cold. In many cases it is advisable that the relaxed state of the skin vessels produced by a warm bath should be kept up, and perspiration encouraged by additional clothing or a higher temperature, but this is only done for a specific purpose, and not from any fear of bad effects from its suppression.

There is one property of the skin to which I wish to draw attention, as on it depends entirely the *modus operandi* and efficacy of bathing in water impregnated with gases, salts, or other ingredients;—and that is, its power of ABSORPTION, or introducing into the system substances applied to its surface. That the skin does possess this property is evident from the

relief for thirst which shipwrecked persons experience by bathing in salt water, instead of drinking it—from the active manner in which mercury and other substances affect the system, when introduced into it through the skin by friction, and from the curative effects exerted by bathing in water holding various medicaments in solution, or by sulphur, &c., when applied in a state of vapour. The scarf skin, when bedewed with its oily secretion, interferes materially with this power of absorption, and fortunate it is for mankind that it is so, otherwise we should be in constant danger of being poisoned by noxious gases, and other deleterious agents finding their way into the system through its means. The extent of surface presented by the lining membrane of the lungs to the action of miasmata, is sufficiently dangerous without increasing so serious an evil by the extensive surface of the skin acting also as a constant absorbent. If the fluid in which the body is immersed is warm, or impregnated with alkaline particles, or if these are combined, the scarf skin becomes softened, and its oily secretion neutralised, so that its absorbing powers are increased in activity, and this explains the action of salt water already mentioned, and the manner in which the Buxton and other mineral waters exert so powerful an influence on the system. Were the scarf skin to remain in its naturally hard or well-oiled condition, bathing would be of very little avail in any case, as it would offer an effectual resistance to the transit of any substances beyond its surface. When we wish to introduce substances which are known to disagree with the stomach, so as to have the full benefit of their agency, we remove a portion of the scarf skin by a blister, and sprinkle them on the sensitive layer, where the process of absorption goes on very briskly, and we find their action quite as powerful as when administered by the stomach. The action of medicinal agents when absorbed through the scarf skin is weaker and slower, but not the less secure, if their temperature and composition be in accordance with the condition stated above. Instances are on record in which persons have had their lives preserved by bathing in warm milk, when the stomach has been so irritable as to refuse food of every kind, or when the passage between that

organ and the mouth has been impervious, and the nutritive principles of the milk passed at once into the circulation, without undergoing the process of digestion. The warmth relaxed the skin, converting it into an absorbing organ. The same thing occurs in using the hot spring here, with the additional effect of its alkaline properties on the oil by which the skin is bedewed, adding greatly to its activity.

CHAP. II.

THE BATHS, SITUATION, &c.

Buxton is situated in the north-west part of Derbyshire, in the hundred of the High Peak, and is twenty-four miles distance from Manchester, twelve from Macclesfield, sixteen from Rowsley, twenty-eight from Chesterfield, and twenty-four from Sheffield. The healing virtues of its hot springs have long been sought after by invalids, while the boldness of the surrounding scenery, affording proofs that it has been at one period the scene of one of those violent convulsions which have totally changed the character of the country—have made it sought after by tourists in search of the beauties of their own land. The town is situated on the banks of the river Wye, which is here a mountain streamlet, but when joined by the Hogshaw at the bridge leading to Fairfield, it becomes sufficiently large to afford excellent trout fishing, as the fish though small in size are of prime quality, and require considerable skill in the angler. It is divided into Upper and Lower Buxton, the former being the original village of considerable antiquity, and the latter of more recent erection, in the neighbourhood of the springs, and comprising The Crescent, The Square, and Spring Gardens. In addition to these a Quadrant is now in course of being built opposite the New Warm Baths, and preparations for a rapid extension of the town in all directions are observable. The wise deter-

mination of the noble proprietor of the greater portion of the town to sell land for building purposes at a fair price has stimulated this desire to build, and the extensive additions already made to the walks and drives in the neighbourhood, and the allotment of sites for villas in the park must eventually increase the value of his property and add much to the prosperity and success of Buxton. The principal spring rises at the edge of the black limestone, in the space between The Crescent and the Old Hall Hotel, and although the water emerges through a number of fissures, some experiments made during last winter show that they all come from one common origin, and the quantity which was formerly variously estimated at from sixty to eighty gallons has been satisfactorily proved to flow at the rate of **ONE HUNDRED AND TWENTY GALLONS PER MINUTE**. The temperature is uniformly a shade over 82 deg. of Fahrenheit. The great increase of visitors, and in fact the requirements of the age had rendered an alteration in the baths indispensable, if Buxton was to keep its place among the watering places of England, and the Duke of Devonshire resolved that the accommodation should be worthy of the virtues of the waters. In carrying this determination into effect there were numerous difficulties to encounter,—the confined space in which the architect had to concentrate his buildings—the necessity for having all the baths as near the spring as possible to prevent loss of temperature, and to make light and cheerful bath rooms instead of the dark cellars which were formerly in existence. But the principal difficulty was to collect and distribute the water, so that each bath should have an independent supply sufficient to keep up a uniform temperature with a good overflow to carry off the scum, and this division of one hundred and twenty gallons into so many different sized baths was no easy task. There are now nine baths, viz:—The Gentlemen's Bath, No. 1, over the principal spring, 26 feet 4 inches by 16 feet 3 inches,—Gentlemen's Bath, No. 2, 28 feet 2 inches by 13 feet 2 inches,—The Ladies' Public Bath, 22 feet by 18. The Men's Charity Bath, 18 feet 6 inches by 14 feet,—The Women's Charity Bath, 18 feet 6 inches by 13 feet 6 inches, and four Private Baths, each bath 10 feet 6½ inches by 5 feet.

The water in all the baths is 4 feet 8 inches deep. The entrance to the baths is by two corridors from the Colonnade, near the St. Ann's Hotel, one for ladies, the other for gentlemen, and the entrance to the Charity Baths is at the other side of The Square, near the Old Hall. Each bath is fitted with a *douche*, and there are several *douche* closets where patients can have the advantage of its application without taking the bath.

The construction of the baths, the sides being built of the white enamelled bricks, and the bottoms of all the baths except the two Charity Baths being white marble, give them a very cheerful appearance, and the bluish transparency of the water renders them very tempting. The dressing rooms will be fitted up with every convenience, and the whole erection is well supplied with pipes circulating hot water to keep up an equal and agreeable temperature in the dressing rooms and corridors. On one side of the entrance to the baths is a new room for drinking the Thermal water; the descent to which is by easy steps, and to the other side the chalybeate spring has been brought in pipes from the Manchester Road, so that patients can now drink whichever water is adapted for their case without any exposure to the weather. This will be found a great advantage in wet seasons, as the patients may take exercise while drinking the water which in such cases is very desirable. All the baths, except two, the dressing rooms, and the corridors are under a glass roof, supported by iron pillars. The gentlemen's baths Nos. 1 and 2 are under the Hall Hotel, but the roof has been raised, and the windows so much enlarged that they are nearly as light as the others under the crystal roof. The glazing throughout has been done with patent rough glass which passes the light without any possibility of seeing through it. The contrast to the old baths is very great, but many of the old visitors cannot reconcile themselves to the change, and they think that so much light has a tendency to dissipate the virtues of the waters. One season's experience has shown this idea to be a *myth*, and there cannot be a doubt of the increased luxury of bathing in such a temperature, in a light where a needle can be seen at the bottom of this pure water, instead

of wading timorously into a black pool where except in a very sunny day, neither the depth nor the extent were perceptible. Dr. Granville's amusing description of an unexpected recognition in the public bath is a tale of the past, and cannot be repeated. The sort of mysterious awe and fear which nervous patients must have experienced under the old system when descending into the water is now at an end, and the dim light of other days has faded. The length, breadth, height, and depth of the baths are now fully developed, and bathers can see their way before they take the leap.

The Hot Baths are at the other end of the Crescent, near the Grove Hotel, and the alteration in them is quite as great as in the Natural Baths. It is only comparatively of late years that Buxton has had the advantage of baths of the natural water which could be heated to any required temperature, and the supply of what we consider in the present day to be an indispensable adjunct to the bath accommodation has so increased the demand, that for the last few years the four Hot Baths were in constant request from six a.m. till eight p.m., and numbers had to wait several days before they could get their turn. Originally two baths were erected, and were at that time, when Buxton was much frequented and was really a gay place, sufficient for the demand. In a few years the advantages of using the water at a higher temperature which impaired considerably its more active properties and rendered its use available in many cases in which the Natural water would have been injurious, became so evident, that the number of baths was doubled, and it was considered that the accommodation of two dressing rooms to each bath would meet the demand. The confined space in which the Warm Baths were situated, selected from its proximity to the Arcade, and to Bingham's Well, which supplied them, and which rises nearly in the centre of the Crescent prevented any extension of the existing baths, and therefore it was resolved to remove the whole block further towards the back of the Crescent, where there is sufficient space for a further extension at a future period if such may be required, and by beginning at the very foundation and erecting large tanks, &c., the architect has had an opportunity of devising a set of Hot

Baths complete in form, in arrangement, and in accommodations which no patching of an old structure could ever have given him. The front elevation is to the Manchester Road, and the baths are connected by a glass arcade with the Crescent, so that invalids can still have all the advantages of bathing without any exposure to the weather. The entrance is by two corridors from this arcade—one for ladies, the other for gentlemen—along the sides of which the baths are ranged. At the entrance of the corridors to each set of baths, a ticket office is situated, where a ticket for one bath, or for a course, may be purchased. We believe this arrangement has been made to do away with the payment of gratuities to the bath attendants.

The New Hot Baths, comprise four private for gentlemen, and four for ladies,—a Public Bath for gentlemen, 25 feet by 16 feet, and another for ladies, 24 feet by 16 feet. The two latter are to be kept at a temperature of 92 or 93°, and will afford unlimited opportunities of using the waters to those whose circumstances may not be able to afford as many private hot baths as their cases may require. The charity patients have had four baths allotted to them, viz:—Two for each sex. There are douche closets in which a warm or cold douche can be taken without using the bath, and a shower and vapour bath of the best construction. In addition to these provisions for hot bathing which are of the most complete kind, a great desideratum has been added in this range of baths, viz:—A Cold Plunging Bath, 25 feet by 15 feet 6 inches. The baths are built principally of the white enamelled bricks which look quite as well and retain the heat better than white marble, and the construction of the private baths is the one most approved for gouty invalids. For those who are so helpless as to require it, a crane and chair will be provided, by which they can be lowered into the bath and taken out again without being obliged to make any exertion for themselves. The Vapour Bath is a very valuable addition to our remedial resources, as I have often found it induce a change of diseased action when every other form of bath had failed. It is less trying than the dry hot air bath which many persons are in the habit of using, and which now forms an important

part of the so called cold water treatment, and it can be followed with a hot shower, or general bath as the symptoms may require. It can be regulated to any temperature, and continued for whatever length of time the medical attendant may consider desirable. The very high temperature to which the water must be raised before it becomes vapour, must nearly, if not quite, destroy or dissipate all its nitrogen, and therefore we see scarcely more stimulating effects than would be produced by the vapour of common water; but the solvent properties of the Buxton waters are so great that the skin is thoroughly cleansed: the perspiration flows profusely, and the lightness experienced is most welcome, particularly after a long continued attack of rheumatism where the acid perspiration has been so disagreeable.

Both sets of baths have handsome fronts of wrought stone, corresponding with the massive architecture of the Crescent, and sufficiently decorated to relieve any stiffness. Every improvement which modern science or art could suggest has been introduced, and the architect, Mr. Henry Currey, of London, deserves the greatest praise for having made the most of the situation and advantages which were at his disposal.

CHAP. III.

ANALYSIS OF THE WATERS, &c.

THE chemical subdivision of mineral waters into their component ingredients has very rarely been sufficient to account for their effects on the human body. The quantity of salts, or other solid matter, found in them, is generally so minute as to leave investigators completely at fault in trying to assign reasons for their powerful agency, and we need not wonder that the homœopathists have laid hold of this fact as one of their strongest arguments. If this is the case with water containing salts, or other ingredients, with whose action, when given in larger doses, we are acquainted, how much must the

difficulty be increased when we are investigating the effects of a gas on the human system, as in the case of the Buxton Waters?

Any person standing at the side of the Gentlemen's Bath, No. 1, will see bubbles of gas rising and bursting on the surface of the water in all directions, and a brisk agitation of any of the baths gives the appearance of soda water; and myriads of small globules may be seen rising to the surface. Till the time of the late Dr. Pearson this gas or air, was considered to be carbonic acid gas which is contained in all spring water, but his experiments led him to the correct conclusion that it was azote or nitrogen, in which he has been corroborated by all subsequent chemists. It would be a waste of space and could serve no good purpose to insert here the various analyses which have been made from time to time of the Buxton Waters. They have all had some leading features in which they agreed, but the quantity of nitrogen which after all is the active principle on which their peculiar effects depend has never been correctly ascertained till last year when Dr. Lyon Playfair brought to the investigation his great tact and experience, and his report is a most valuable addition to what is already known practically on the subject. I insert it here, along with the last made by the late Sir C. Scudamore assisted by Mr. Garden, of London, to whose general correctness Dr. Playfair pays a justly merited compliment.

DR. LYON PLAYFAIR'S REPORT.

I visited Buxton on the 8th and 9th of April, for the purpose of collecting the water of the thermal spring for analysis.

The water was collected partly in glass-stoppered bottles, and partly in earthenware jars. The gas, as it issued from the crevices of the rock and bubbled through the water, was caught by an inverted funnel, and collected in glass bottles filled with the thermal water itself. These bottles were then sealed on the spot; and the evidence derived from the gas contained in them, shows that the precautions used for preventing the access of air were quite successful.

It is not necessary for me to describe the physical conditions under which the thermal springs appear at Buxton.

It may be sufficient to state, that they issue from fissures in the limestone, and are accompanied by frequent, but intermittent bursts of gas, which escapes partly as large bubbles, and partly in innumerable small bubbles, giving to water freshly collected in glass vessels, all the appearance of soda water.

The water is clear, sparkling, inodorous, and when cool, is almost tasteless. Its temperature is 82° Fahrenheit, and its specific gravity 1.0003.

Two points had specially to be attended to in the analysis of the waters,—firstly, to ascertain the nature and quantities of the ingredients in solution, and, secondly, the character and composition of the gas accompanying them.

In order to be sure that every ingredient came under my observation, I caused 100 gallons of the water to be evaporated down to about half a gallon, and examined the deposit and residual solution for bodies which might be present in such small quantity as to escape detection in the unconcentrated water. The precaution was found to have been necessary, for, in addition to the ordinary constituents of the waters, two more rarely occurring bodies—viz.: fluorine and phosphoric acid—were found to be present, although only in minute quantity. The amount of fluorine was, however, sufficient to etch glass when applied with proper precautions. Neither iodine nor bromine could be detected.

The following analysis gives the amount and nature of the solid ingredients in one imperial gallon of water at 60°:—

	GRAINS.
Silica - - - - -	0.666
Oxide of iron and alumina - - -	0.240
Carbonate of lime - - - - -	7.773
Sulphate of lime - - - - -	2.323
Carbonate of magnesia - - - -	4.543
Chloride of magnesium - - - -	0.114
Chloride of sodium - - - - -	2.420
Chloride of potassium - - - -	2.500
Fluorine (as fluoride of calcium) -	trace
Phosphoric acid (as phosphate of lime)	trace
	<hr/>
	20.579

On examining the water, there were found present carbonic

acid and nitrogen, in addition to the solid ingredients. It was important to estimate the amount of the former in an exact manner. Some of the water was received from the spring into a glass-stoppered bottle, and the stopper was immediately inserted and secured. One gallon of the water was found to contain altogether 13·164 grains of carbonic acid; but of this quantity, 5·762 grains were due to the carbonates of lime and magnesia, and therefore only 7·402 grains could in any sense be considered as free. Again, the carbonates of lime and magnesia are present as bicarbonates, or as carbonates dissolved in carbonic acid, and 5·762 grains of carbonic acid would require to be added for this purpose. Hence, of the 7·402 grains, or 15·66 cubic inches of gaseous carbonic acid in the water, only 1·640 grain, or 3·47 cubic inches, can be considered as wholly free and uncombined.

The nitrogen in the water could only be present in solution, and not in combination; and as there is no very accurate method for ascertaining the precise quantity of this gas in the water at any given temperature, it was considered chiefly important to ascertain accurately, the composition of the escaping gas, as this would indicate that of the gas held in solution. The following are the analyses of two portions of the gas collected as formerly described, the analyses being given *according to volume*.

	I.	II.	MEAN.
Carbonic acid - -	1·169	1·164	1·167
Nitrogen - - - -	98·831	98·836	98·833
Oxygen - - - -	trace	trace	trace
	<hr/> 100·000	<hr/> 100·000	<hr/> 100·000

The gas, therefore, consists entirely of carbonic acid and nitrogen; for the oxygen, which did not amount to one-tenth per cent., may be viewed as quite accidental, arising probably from the corks used to close the bottles.

Judging from the analysis and proportion of the gases, it is assumed that, *at the moment of issue*, the water is charged with 206 cubic inches of nitrogen, and 15·66 cubic inches of carbonic acid. This assumption is founded upon the proportional relation of the two gases. The proportion of carbonic acid in the

water being determined, and the proportion of carbonic acid to that of nitrogen contained in the water being 1·2 to 98·8, the amount of nitrogen contained in the water at the moment of issue may fairly be assumed to be 206 cubic inches per gallon.

Before remarking further on the above analysis, it may be useful to refer to that by Scudamore. The analysis given by him was upon the wine gallon, which is one-fourth less than the imperial gallon. Correcting for this difference, Scudamore found 20 grains of solid matter in a gallon—a result not materially different from that detailed above. The solid ingredients do indeed differ to some extent in the two analyses; but it must be recollected that analytical chemistry is now in a much more advanced state; and, instead of being surprised at the differences, we are rather inclined to admire the precision with which the points had been made out.

From a consideration of the previous analysis, I am inclined to ascribe the medicinal effects of the water almost entirely to its gaseous constituents. The water, deprived of its gases, has the composition of an ordinary spring water, with the exception of the fluorine and phosphoric acid, both of which are present in mere traces; and it is therefore difficult to conceive that they can have any medicinal effect when the water is used for baths. The gases are, however, nearly of the same composition as those of the thermal spring at Bath, and there is no reason to doubt that dissolved carbonic acid and nitrogen may exert important physiological effects. At all events, the singular chemical character of the Buxton tepid water must be ascribed to its gaseous, and not to its solid ingredients.

SIR C. SCUDAMORE'S AND MR. GARDEN'S ANALYSES.

Gaseous Contents.

			Cubic Inch.
Carbonic acid	...	...	1·50
Nitrogen	..	...	4·64

Solid Contents.

			Grains.
Muriate of magnesia	...	...	·58
„ of soda	...	...	2·40
Sulphate of lime	...	...	·60
Carbonate of lime...	...	...	10·40
Extractive matter and a minute quantity of vegetable fibres	...	...	·50
Loss	...	...	·52

15·00

The above analyses are not so discordant in their results as to enable us to judge by Dr. Playfair's of the *modus operandi* of the Buxton water more accurately than we could by Sir Charles Scudamore's. We may infer that the great quantity of nitrogen it contains must be the property on which its efficacy depends, but we are not yet sufficiently acquainted with the action of that agent in health and disease to tell in what way it produces this effect. Experience has taught us that in a certain stage of rheumatism and gout, these waters exert almost a specific power, and in other diseased conditions in which the secretions show a deficiency of nitrogen, that with the use of these waters the natural and healthy proportion of this gas in the secretions is restored, and with this restoration that health returns. The solid ingredients are not sufficient to account for these effects, and the carbonic acid gas is too small in quantity to be taken into consideration in the sometimes almost miraculous cures which these waters effect. The two new ingredients discovered by Dr. Playfair appear too minute in quantity to have the effects attributed to them, unless the theory of the most infinitesimal homœopathists is true; and even if it were true to the thousandth part of a grain, we should be as much at a loss to account for the effects as we are at present. We must therefore for the present be content with the facts that the Buxton waters have been distilled for centuries in the great laboratory of nature—that as far as we know they have been of the same temperature and the same composition since they first forced their way through the fissures in the limestone—that they healed the same diseases then as they do now, and that a judicious use of them will relieve a class of sufferers on whom the whole contents of the pharmacopeia may be tried in vain. At the time of the Reformation the Chapel of St. Ann was decorated with crutches, which Lord Cromwell destroyed as emblems of popery; and notwithstanding the changing theories and practice of medicine which have prevailed and failed since that time,—in the face of the great improvements which modern medicine claims in the investigation and treatment of diseases, and the numerous new remedies which chemistry and pharmacy have placed at her disposal,—the lame and the halt still find a healing virtue

in those waters sought for in vain elsewhere, and did their gratitude assume the form of votive offerings, we should still have crutches hung round our Church by those who have been rendered independent of their use and had the blessing of health and activity restored.

From what has been already observed of the invigorating effects of nitrogen, we may infer that cases of debility and relaxation of fibre are the best adapted for a course of these waters, and we find that in certain forms of dyspepsia or indigestion, proceeding from intemperance, or an inadequate supply of nervous energy, from the mind being harassed with anxiety or the cares of life, and which are attended with loss of appetite, languor, flatulence, disinclination, or incapacity for business, and that sort of morbid aversion to society by which this protean malady is distinguished, generally are speedily and permanently relieved by a judicious use of the waters: The first effects may not be very encouraging—the patient may be annoyed by distension of the stomach and headache after drinking the water, or diarrhœa may occur, but unless these go on to a great extent there is no cause for alarm. A little aromatic tincture, as of ginger or cardamons, or, what I usually recommend, a glass of brandy and hot water without sugar, is all that is required to counteract these disagreeable symptoms. This relaxed condition of the bowels is generally looked upon as a favourable symptom in such cases, particularly if it be unaccompanied with pain, a sense of debility or faintness, as it seems to arise from a more healthy and stimulating state of the secretions concerned in digestion. We have, therefore, none of the nausea and depression usually accompanying such a deranged state of the bowels, but, on the contrary, increase of appetite and an elevation of strength and spirits. The soothing and detergent effects of the water when taken internally, in proper doses, acts most satisfactorily in those cases of indigestion where the quality of the bile and the other juices has become acrid and irritating, and where the drastic purgatives only afford a temporary and variable relief. “The tenacious soapy bile,” whose morbid effects are so graphically described by Dr. James Johnson, as the cause of some of the most frightful forms of dys-

pepsia, is speedily altered in quality, and effectually carried off, by which the corresponding train of symptoms is relieved and removed. Cold water will produce the same effects, but the temperature of the Buxton spring, and its peculiarly stimulating, yet soothing, properties act more speedily and efficaciously, particularly if the rules regarding diet, early hours, exercise, and abstemiousness enforced at hydropathic establishments are at the same time observed, which the practitioner here cannot always be sure of. The condition thus relieved is fully described by Dr. Johnson in his "Treatise on Indigestion." He says :—

"The term 'blue devils' is not half expressive enough of this state; and if my excellent friend, Dr. Marshall Hall, meant to describe it under the head of '*mimosis inquieta*,' he never experienced it *in propria persona*! This poison acts in different ways on different individuals. In some, whose nervous systems are not very susceptible, it produces a violent fit of what is called bilious colic, with excruciating pains and spasms in the stomach and bowels, generally with vomiting or purging, which is often succeeded by a yellow suffusion on the eyes, or even on the skin. Severe as this paroxysm is, the patient may thank his stars that the poison vented its fury on the body instead of the mind. Where the intellectual faculties have been much harassed, and the nervous system weakened and rendered irritable, the morbid secretion acts in that direction, and little or no inconvenience may be felt in the real seat of the offending matter. The mind becomes suddenly overcast, as it were, with a cloud ;—some dreadful imaginary, or even unknown evil, seems impending; or some evil of trifling importance in itself is quickly magnified into a terrific form, attended, apparently, with a train of disastrous consequences from which the mental eye turns in dismay. * * I believe such a train of symptoms seldom obtains, except where there has been a *predisposition* to morbid sensibility, occasioned by mental anxiety, vicissitudes of fortune, disappointments in business, failure in speculations, domestic afflictions, too great labour of the intellect, or some of those thousand moral ills which render both body and mind so susceptible of disorder.

"In some constitutions, especially when there has been gout in the family, or some hereditary disposition to disease, these attacks of vitiated secretion in the glandular organs of the digestive apparatus seemed almost necessary from time to time to clear, as it were, the constitution, like paroxysms of gout itself. It is hardly possible, in such cases, to prevent entirely the recurrence of these storms even by the strictest attention to diet, regimen, and medicine; but if these precautions are not taken to retain

the violence and lengthen the intervals, the attacks become dangerous, and derangement of function may ultimately end in disease of structure. On this account people should not consider their temperance and vigilance as thrown away, because these periodical visitations cannot be entirely prevented by the most skillful physician."

In entering on a course of these waters, such cases often require what is called a preparation, provided they have not been under medical treatment immediately before coming here. A mild mercurial, as Plummer's pill, or mercurialized chalk, combined with extract of hyosciamus, taken in the form of a pill at bed-time, with an aperient draught of Moxon's Effervescent Magnesia, or infusion of rhubarb with tartarised soda and tincture of Cardamoms, next morning, is usually sufficient to enable the stomach to receive the water without its producing any disagreeable symptom. The great majority of cases require little more medicine during treatment, unless where constipation occurs, and then a common warm aperient pill, such as is prepared by the druggists, entirely free from mercury in any form, or one composed of equal parts of compound extract of colcyntn and extract of rhubarb, is all that is necessary. Occasionally where the nervous system is much exhausted, as has been the case of late years from the tremendous extent of speculation into which so many were led, the first agreeable effects are of short duration, and the exhilaration is followed by exhaustion of spirits, an indolent condition of the secretions, and the patient is apt to indulge in melancholy prognostications of his state. But these symptoms are simply the consequence of the previous nervous exhaustion, and are speedily alleviated by the exhibition of a gentle tonic in combination with a moderate use of the waters, and a rigid observance of proper rules for diet and exercise. These two last items in the treatment cannot be too much nor too often insisted upon, as it is absolutely impossible for any remedy to alter and improve the state of the secretions of the digestive apparatus, unless the consumption of every article likely to derange them is carefully avoided. "Many a happy and lucky thought has sprung from an empty stomach—many an important undertaking has been ruined by a bit of undigested pickle;" and many a good prescrip-

tion has been baulked in its effects from the same cause. Patients affected with this malady should endeavour, in the first place, to leave business and its anxieties behind them, and then, having cleared out the *prima viæ* in the manner recommended, and rested a day or two to overcome the fatigue of travelling, and get accustomed to the change of air, they should begin with a warm bath at 98 deg. of Fahrenheit, and repeat it twice on alternate days, reducing the temperature two degeees each time, so that the last bath may be 94 deg. The water may be drank at the same time, beginning with half a pint, which should be taken at twice, one-half, an hour, at least, before breakfast, and the other half in two hours after that meal, and the quantity should be gradually increased to a pint, provided no symptoms arise to contra-indicate its use. A larger dose than this is scarcely ever necessary, but when it is, the interval between luncheon and dinner, or when this meal is taken early in the day, three hours after it, is the best time for taking another half-pint, and this quantity is generally found to be as much as the stomach will bear advantageously. Exercise should be taken before and after drinking the water, in order that it may be distributed through the system as speedily as possible. In a day after the last of the specified number of hot baths, the natural bath should be tried with the precautions pointed out under the general rules for bathing, and repeated every second day, or more or less frequently, according to its effects. It should always be borne in mind that the very utmost which art can accomplish in the cure of disease, is to induce Nature to assume a healthy action, and to regulate the reparatory process thus instituted; stimulating it when too languid, and modifying and curbing it when too energetic. It is unreasonable for persons who have been invalids for years to expect an immediate cure, or that the first very agreeable impressions will become more vivid and permanent every day, particularly in those cases in which the nervous power has been impaired by intemperance, or wasted with corroding cares. "Patience and perseverance" should be the motto of every one who seeks to rescue his future life from the miseries attendant on this condition, and the slightest amendment may, in nearly all cases, be looked

upon as denoting a power in the constitution sufficient to shake off the effects of those ruinous agencies to which it has so heedlessly, and often so needlessly, been subjected. The good effects resulting from the use of the Buxton Waters in this class of complaints, are observed in most others wherein nervous debility is one of the prominent symptoms. This term has become very common of late years, and though applied to a great variety of symptoms, is always indicative of a disturbance in that regular distribution of the nervous fluid, upon which the proper performance of their functions by the various organs so much depends. When it depends on spinal irritation, or is one of the consequences of congestion in the brain, and accompanying paralysis,—when in fact its presence is clearly referable to some lesion in the great centre of the nervous system, the utmost caution is necessary in using so powerful a remedy. But in the former disease, when the inflammatory action in the investing membrane of the spine has been subdued, and the principal remaining symptoms are one or more forms of hysteria, with occasional loss of power in the extremities, sluggish condition of all the secreting organs, and general want of tone, the effect of these waters is most satisfactory. A short time ago I had two patients under my care at the same time, in one of whom these symptoms were very prominent. There was loss of voice, incapacity for motion, the muscles which supported the body in the erect position had lost their power, frequent paroxysms of difficulty of breathing, threatening suffocation, constant head-ache, deranged condition of the stomach with variable appetite, pulse at the wrist sometimes as low as 50 beats per minute, and then rising suddenly to 120 or more, and a general emaciation of the whole frame consequent on two or three years of such suffering. With one or two drawbacks the case progressed favourably; in a few weeks the patient was able to take walking exercise, and after two courses of bathing returned home quite well. In the other case the symptoms were not so painful, but the patient was incapable of attending to any duties, or of walking up the smallest incline,—the general health had suffered very much. In this case also the improvement was most satisfactory,—perfect ease and free-

dom of motion being obtained, and the general system became comparatively strong and robust.

When nervous debility is one of the consequences of a stroke, as it is called: i. e., when it is the consequence of apoplexy, and is present along with the loss of feeling and motion in some of the limbs, the use of any stimulant must be very cautiously entered upon. But when the cause of irritation can be traced, and has been subdued, and when merely the loss of sensation or motion remains, a course of these baths frequently succeeds in restoring the suspended function of the nerve affected. In combination with galvanism I have seen the very best effects produced in some cases of old standing.

The great majority of patients who now resort to Buxton are affected with rheumatism, gout, rheumatic gout (a term which will ere long become obsolete,) or their consequences, and there is little doubt but that its original fame as a watering place originated in its powerful efficacy in the relief of the first of these diseases which so often sets medicine at defiance. A recent writer on chronic rheumatism, after giving a list of remedies which have been tried and failed for the cure of this disease, honestly observes "a remedy of certain power is still a desideratum." The effects are most obvious in the consequences of the acute form of the disease, after what is known as rheumatic fever, leaving general debility of the whole system, and the loss of power sometimes in every joint. The recovery in such cases is usually rapid,—the restoration of sensation and motion occurring after the first immersion. When the chronic form of the complaint is of longer duration, and the joints have become enlarged from effusion or a thickened gristly state of the surrounding tissues, the good effects are more slowly manifested, but they are not the less certain, as the published yearly records of the Bath Charity show. Of course the cures are more rapid when the patients are young, but I have frequently witnessed a perfect restoration of patients considerably advanced in years; and many in whom little perceptible amelioration was observable at the time of leaving Buxton, have written the most favourable accounts of themselves on their return home.

In a variable climate like ours, persons of every age are subject to the attack of rheumatism, but those whose occupations expose them to the vicissitudes of the weather are more liable to be seized by it than others who have this world's comforts and luxuries at command. Colliers, farm labourers, and men engaged in manufactories artificially heated, constitute the greater proportion of male cases among the working classes, and the following abstract from my Bath Charity book will shew the relative ages at which they are attacked. Out of 546 cases, viz., 326 males, and 220 females, I found the following ages :—

Under 20		Between 20 and 30.		Between 30 and 40.		Between 40 and 50		Between 50 and 60.		Between 60 and 70		Above 70.	
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
17	13.	42	46	70	57	66	47	75	27	49	26	7	4

The oldest male was 75

The oldest female, 78

The youngest do., 16

The youngest do., 11

The majority of the female patients were house servants, charwomen, and factory girls.

If any remedial agent is entitled to be deemed a *specific*, assuredly these waters may lay claim to the epithet when properly administered in these painful and frequently intractable complaints. The various phases which rheumatism assumes, whether *lumbago*, *sciatica*, or *tic doloieux*, are equally under the control of this remedy, if the circumstances of the case warrant its use. When there is fever present, with a quick jerking pulse, and a furred tongue, the natural bath will do more harm than good. These symptoms must first be got rid of by medicine otherwise they will certainly be increased, and the patient disappointed in obtaining the relief which he was led to expect. An error in diet, or an occasional injudicious exposure to the weather, will sometimes produce such symptoms; and occasionally they occur even under the most cautious treatment, when it becomes necessary to cease bathing until they are subdued, and recommence with a warm bath as at first. Very generally increase of pain, but unattended with fever is a consequence of the bath, and is reckoned a favourable symptom. So far it is, as we cannot expect an alteration of diseased structure to be produced without some altered condition of the blood vessels and

absorbents of the part, and such an alteration is rarely unaccompanied with pain. The victims of this complaint not only require to exercise all their philosophy during the vehemence of its attacks, but also during the cure, as their sanatory progress is so liable to be interrupted and impeded by the most trifling causes, and their hopes of a certain restoration to health dashed to the ground, when they were apparently all but realised. But let them not despair, for experience warrants me in encouraging them to persevere even under the most disheartening circumstances. Where there is much effusion in the joints, or where the free play of the tendons is obstructed by an inflamed and thickened state of their investing membranes, the application of shampooing, or of galvanism, is almost indispensable to produce absorption, to stimulate the relaxed state of parts, and restore them to their natural state. The efficacy of the latter powerful remedy is only just beginning to be appreciated, and I have often known it to succeed when all other means had failed. It ought only to be applied by persons acquainted with its nature and the distribution of the nervous system. The pump, or douche, ought also to be had recourse to, beginning with, say thirty strokes, and increasing at each bath until it may be continued for four or five minutes. If the extremities are the parts affected, the douche may be used every day, both when the patient bathes and when he does not, as by protecting himself with Mackintosh the application can be confined to any part that may be desired.

The consequences of mercurialisation are under the control of these waters. When the system has been reduced, and the constitution almost ruined by repeated salivations, and when the blood seems saturated with mercury, the most happy results are produced by their use, joined to full doses of the Iodide of Potassium.

For many years, and before the continental mania set in, by which so many have been led to forget and neglect nearly all that was beautiful and good at home, Buxton was the fashionable resort for members of the higher classes and others afflicted with gout, and it was generally believed that its waters were not only efficacious in relieving the effects of

preceding attacks, but that they so strengthened the constitution, as to fortify it against the liability to a fresh attack for a considerable subsequent period. I have seen numerous cases, in which the annual three weeks' course of bathing, combined with that care in regard to living, which those afflicted with this disease learn to observe, secures immunity from any severe attack during the winter months, and in which an occasional omission has been certainly followed by months of suffering. The experience of these regular visitors attests not only to the immediate curative properties of the waters, but also to the production of certain changes in the constitution sufficient to overcome for a time the gouty diathesis. In young persons hereditarily disposed to this disease, and who have not aggravated their inherent tendency by any errors of diet or indulgences, the effects of a course of bathing are very beneficial;—the wandering pains assume a more decided and fixed character, the whole system is renovated and braced up, and such a change is produced in a few weeks as to render the life of the patient comfortable for years. In such cases from eighteen to twenty-four baths should be taken, beyond which number it is not advisable to proceed in any case. If more baths are required, a lapse of a fortnight should be made, as the debility which would result from taking a greater number would be sufficient to undo much of the good which had previously been produced. The usual course of bathing includes from twelve to eighteen baths, and it is only necessary in certain temperaments, and where the constitution is much affected to extend it beyond the latter number. In a disease which assumes so many varieties as gout, and which is so serious in its consequences, if improperly treated, it is impossible to lay down a mode of treatment which would be applicable to every case. So much depends on the duration of the disease and on the exciting causes, whether from indulgence or hereditary predisposition, and the treatment which has been pursued so modifies the symptoms, that every case presents some peculiar features which require to be treated separately. If the inflammatory stage has been subdued, and the various abdominal secretions restored to a healthy condition, the patient should commence

with one or two hot baths, and then have recourse to the natural bath, which should not be taken oftener than four times a week.

There are three principal points to be attended to by persons using the bath, viz., the hour at which it should be taken; the interval that should elapse between the times of bathing; and the length of time that is safe and proper to remain in the water. All remedies are liable to abuse, and of course the more active they are, the greater mischief will be produced by their improper application. It is very natural for persons who suddenly find relief, after, it may be, years of suffering, to suppose that if a limited immersion is attended with a little relief, an extension of it will be correspondingly successful. But this is a mistake, and I have seen several cases in which great mischief was done by such impatience. One season I was consulted by a man who complained of the inefficacy of the Buxton Waters, as he had been bathing for a week and was worse instead of better, and I was not surprised that it was so, when he told me that he had bathed three times every day, and remained in the bath from twenty minutes to half an hour each time. The feverish symptoms which this folly had excited were soon subdued, and he speedily recovered under a more gentle application. When the patient has rested for a day, to rally from the effects of travelling, and has made the most of his time by taking a little aperient medicine, to guard against a constipated state of the bowels which generally attends change of water and living, and provided there are no acute inflammatory symptoms present, he should begin with a warm bath at 98 degrees of Fahrenheit for ten minutes, which is to be repeated next day three degrees colder. A day should then be allowed to intervene, when the Natural Bath may be tried. At the commencement of the course, the best hour for taking the hot bath is an hour or two after breakfast, or in the evening, when the patient can retire at once to bed, which keeps up the action of the skin, and excites a moderate degree of perspiration, even in cases where diaphoretic medicines had been tried and failed. The best time for beginning with the Natural Bath is two or three hours after breakfast, when the

stomach has nearly performed its function on that meal, and the system is active under the nutrition afforded by it. If possible, brisk walking exercise should be taken before going to the bath, so that the skin may be warm, as the reaction is thereby more certainly and speedily produced. In describing the effect of cold water on the skin, I have described in what reaction consists, and although the shock from water at a temperature of 82 degrees, being only 16 degrees under blood-heat, is of course not so great as from immersion in cold spring water, yet it is quite sufficient to drive the blood from the surface, and produce a sensation of cold, and when the system has been greatly reduced by disease and suffering, the shock is as much as the patient can bear. In a few seconds the cold sensation is succeeded by a highly agreeable glow, more speedily obtained and increased by moving the limbs about to as great an extent as the patient can. The power of motion is often much greater in the water than the state of the patient out of it would lead us to expect, and both in my own case and in others I have found a cessation of pain, and a restoration of motion at the first bath. As much friction as can be borne without pain should be used to the part affected when in the water, and as soon as reaction is fully established, the patient should leave the bath, and have the whole skin well rubbed down with rough towels and Dinneford's flesh brush till it becomes quite red. When dressed, a comfortable degree of warmth should be experienced, and a lightness and elasticity of spirits, forming a great contrast to the previous lassitude and despondency. Life then, instead of being a burden, seems to open up fresh attractions, and all the powers, both bodily and mental, are invigorated and re-strung. The complexion becomes clear, the eye bright, the mental faculties are roused, and, what is perhaps the greatest sensible luxury of all, the skin becomes as soft as velvet, and as clean as an infant's. From the clearing of the cutaneous pores, and the excited state of the blood vessels on the surface, perspiration is easily induced, and therefore the invalid should be careful for an hour after using the bath. Not from any danger of taking cold when in that state, but for the sake of encouraging Nature in her efforts to get rid of these im-

purities by pouring them through such a channel. The best plan is for the patient to return to his lodgings and remain quiet for an hour or two. He should then turn out, if the weather does not prevent him, and take his second glass of water, (having taken the first an hour at least before breakfast,) and be in the air till dinner time. After the second Natural Bath a day's rest should be taken, and then proceed again at the same hour for two days more, and so on to the end of the course. The strength of the patient is generally the best rule to be guided by, and when the constitution has not been much impaired, or where the forenoon baths have been beneficial, and the patient's strength is returning satisfactorily, the bath may be used before breakfast with decided advantage. The douche should not be used for the first two baths, as it may excite too much action in the vessels of the affected part, and inflammation may be produced instead of the healthy reparatory process it is so desirable to promote.

Sometimes too great excitement in the system is induced by the use of the Bath, and the feverish symptoms consequent on it are attended with considerable increase of pain in the part originally affected. Many of the distressing characteristics of acute rheumatism return, and the patient is apt to be discouraged and disappointed. In such cases a repetition of the medicine recommended to be taken at the commencement of the course, and a hot bath on the following day at a temperature of 96 degrees, are generally followed by complete relief, and the patient is enabled to return to the Natural Bath, and is often rather benefited than otherwise by the interruption.

There are still two other matters of primary importance in the application of every remedial agent, which the invalid who seeks a restoration to perfect health, must never lose sight of for an instant, viz., diet and exercise. One of the first beneficial effects of the Buxton Waters, and one which we must always have present in the transition from disease to health, is an increased appetite, and a restoration of the tone of the stomach, and it requires considerable firmness in a man who has very probably been *gruelled* for months, to resist the many attractive dishes with which the tables at the

different hotels are supplied, and confine his patronage to those which are simply nutritious and easy of digestion. The immediate penalty he must pay for this self-indulgence is generally considered as a sufficient punishment, and I have known some men who would risk a sleepless night, and a recourse to medicine, rather than deny their palate some trifling gratification. But the consequences of such folly are not so easily got rid of, as every interruption in the progress of cure abstracts so much from the strength of the constitution, and the disease thereby gets more firmly seated, and will, of course, require a greater effort to remove it. Peculiarities of constitution sometimes occur in which eccentricities of diet seem to be absolutely necessary, but, generally speaking, plainly cooked food, repeated at proper intervals, will be found to agree the best. For breakfast two small cups of tea or coffee, with a slice of bacon, the yolk of a light boiled egg, and dry toast, is sufficiently nutritious and easy of digestion—and dinner, which should be taken about midday, by those who have been much debilitated by their previous sufferings, should consist of a mixture of animal and farinaceous food, if the stomach will bear it, and at least an hour's rest afterwards should be observed. A mutton chop, a beef steak rather underdone, or the same description of meat plainly roasted or boiled, with rice or a very mealy potato, and a light pudding of sago, tapioca, or arrowroot, after, will agree with almost every constitution. A very valuable addition to our stock of farinaceous food has recently been made by Mr. Bullock, of London, in SEMOLA, one of the lightest and most nutritious agents we possess. He has also suggested boiled wheat, which I have found to be one of the most nutritious of vegetables, and generally obviates constipation. It is prepared by boiling wheat for two hours, and served with gravy or butter sauce. The mixture of the bran and gluten renders it both nutritious and aperient. Lamb and veal must be avoided as requiring strong digestive powers, but white fish, as trout, whiting, haddock, sole, or cod, and chickens, with every description of game, enable the invalid to have an almost endless variety of light, pleasant,

nutritious food, from which to choose the important meal of the day. A few vegetables may be allowed in the *carte*, as brocoli, cauliflower, and tender peas, but these must be better boiled than one usually meets with them at public tables, in order not to be positively injurious. Great discrepancy of opinion exists as to the drink best calculated for the invalid, and when we look at the volumes which have been written within the last few years on this part of dietetics, we are puzzled how to decide, as we hear all fermented and spirituous liquors denounced on the one hand as positive poisons, and on the other, see men who have reached the utmost limits of human life laid down by the Psalmist, and have been in the habit of taking a certain quantity of beer, wine, or spirits every day. I believe that many writers on this subject have formed their dogmas from their own cases, and have laid down as rules for the rest of mankind those principles of diet, which they have found to agree best with themselves. Such a mode of proceeding requires little confutation, and every man is, or at least ought to be, the best judge for himself, whether a small quantity of any form of stimulant agrees with him or not. When taken in excess there cannot be two opinions of its injurious tendency; but I have often seen a few glasses of sound Sherry, Madeira, or Hock, or weak brandy and water, assist digestion, and those who have been in the habit of taking a few glasses of wine every day cannot leave it off entirely without suffering from it. With gouty and rheumatic patients, where there is a tendency in the constitution to convert all fluids into acids, malt liquor would disagree, but others who have not such tendency may take a glass of sound bitter ale, or London stout, with decided advantage. Popular rules for diet are now published at so cheap a rate, and the various articles of food and drink so accurately tested and examined, that there is no excuse for any man being ignorant of their qualities, and as experience must teach the most careless certain lessons which cannot be disregarded with impunity, it is unnecessary to swell out this work with a larger catalogue. Tea should be taken about six o'clock, if taken at all, avoiding buttered toast, muffins, and the whole class of tea breads; and boiled

milk, or some preparation of sago or arrowroot, for supper, an hour at least before going to bed.

Exercise is of nearly as much consequence as diet in the cure of disease, as if kept within proper bounds it assists the circulation and distribution of all the fluids, increases the appetite, prepares for sound sleep, and restores the firmness of the whole muscular system. If carried beyond the point of fatigue, it weakens the body by exhausting the nervous energy, gives rise to restlessness and indigestion, and injures the diseased limbs which have not properly regained their strength. When commenced in moderation, it may be increased in duration every day, till at the end of a week often, the convalescent is able to perform feats of locomotion which he deemed impossible. *Festina lente*, or slow but sure, should be the motto.

